Pediatric Neurological Exam Checklist – Systemic Exam

Learnpediatrics.com - Written by Dr. R. Acedillo, modified by Dr. D. Louie

EXAMINATION	OSCE ITEMS	
Initial	**Inspection** ❑ ABCs ❑ Distressed? ❑ Well vs unwell looking ❑ Level of consciousness	
General Appearance	**Inspection** ❑ Body Habitus ❑ Dysmorphic features **Measure and Plot on Growth Chart** ❑ Weight ❑ Height ❑ Head circumference	**Vital Signs** ❑ Heart rate ❑ Respiratory rate ❑ Blood pressure ❑ O2 Sat ❑ Temperature
Screening Exams	**Cardiac** ❑ Heart sounds **Abdominal** ❑ Hepatic enlargement **Neck** ❑ Supple/Meginismus ❑ Kernig's test ❑ Brudzinski's test	**Skin** ❑ Hyperpigmented lesions – café au lait spots ❑ Hypopigmented lesions – ash leaf spots **Spine** ❑ Scoliosis ❑ Tuft of hair

Pediatric Neurological Exam Checklist – Mental Status (for children > 7 yrs)

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**Mini-mental Status Exam (MMSE) items where indicated in italics (value of MMSE items also shown)*

EXAM	OSCE ITEMS (use as necessary to test each component of the exam)

Inspection

1. Level of Alertness, Attention and Cooperation
- ❑ *Spell WORLD forwards and backwards (MMSE=5)*
- ❑ Digit span (minimum 6 forward, 4 backward)
- ❑ Name months forwards and backwards

2. Orientation
- ❑ *Person's name, day, month, season, year (MMSE=5)*
- ❑ *Floor, hospital, city, province, country (MMSE=5)*

3. Concentration and Memory
- ❑ Recent memory: *Recall three items (MMSE=3)* from language tests (see below)
- ❑ Remote memory: Any historical or verifiable personal events (birth date, prime ministers, etc)

4. Language
- ❑ Spontaneous speech: Fluency, phrase length, abundance, paraphasic errors (inappropriate substituted words), neologisms, errors in grammar, prosody
- ❑ Comprehension: Logical thinking, abstract thinking (include simple questions and *3-step commands [MMSE=3]*)
- ❑ Naming: *Identify easy objects (pen, watch etc – MMSE=2)* and difficult ones (fingernail, stethoscope, etc).
- ❑ Repetition: *"No if's, and's, or but's" (MMSE=1, repeat three words "cat, red, baseball", etc (MMSE=3)*
- ❑ Reading/Obeying: Read aloud single words, brief passage, paragraphs, *read and obey ([MMSE=1] test for comprehension)*
- ❑ Writing: Ask patient to write their name and *a sentence (MMSE=1, copy design (MMSE=1)*

5. Non-Language Dominant Parietal (Gertsmann's Syndrome)
- ❑ Calculations: simple addition, *subtraction (100 minus 7, etc – MMSE substitute for "WORLD"*)
- ❑ R/L Confusion: identify body parts, obey commands ("take your right finger and touch your left ear")
- ❑ Finger agnosia: Name and identify each digit
- ❑ Agraphia: Write name and sentence (see language)

6. Apraxia
- ❑ Pretend to comb your hair
- ❑ Pretend to brush your teeth
- ❑ Pretend to hammer a nail
- ❑ Pretend to strike a match and blow it out

7. Non-dominant Parietal Functions (Neglect and Constructions)
- ❑ Neglect: Neglect drawing test (clock, line-cut-in half), extinction double simultaneous stimulation, look for anosoagnosia
- ❑ Construction: Copy complex drawing (e.g. house, *two pentagons, clock test [additional MMSE challenge])*
- ❑ Dressing

8. Sequencing Tasks and Frontal Release Signs/Frontal Lobe Dysfunction
- ❑ Perseveration: Written or manual alternating sequencing task)
- ❑ Motor impersistence: "Raise your arms", "look to your right", auditory Go-No-Go tests
- ❑ Frontal release signs: Changes in personality, grasp reflex

9. Logic and Abstraction
- ❑ Problem solving, series generation (AZ BY, CX)
- ❑ Abstract thinking (proverb interpretation)

10. Hallucinations and Delusions
- ❑ Auditory or visual hallucinations (ask them questions)
- ❑ Delusions (ask them questions)

11. Mood
- ❑ Signs of depression, anxiety, or mania
- ❑ Mood, changes in eating, sleeping patterns, loss of energy, loss of motivation and initiative, low self-esteem, poor concentration, lack of enjoyment of previously pleasurable activities, self-destructive or suicidal thoughts and behaviours.

Pediatric Neurological Exam Checklist – Cranial Nerves

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EXAM	OSCE ITEMS (use as necessary to test each component of the exam)
Inspection/ Palpation	**1. OLFACTION (CN I)** ❑ Any non-noxious odor (test each nostril separately) **2. VISION (CN II)** ❑ Visual acuity (wear corrective lenses, eye chart, one eye at a time) ❑ Colour vision (name colour of objects) ❑ Visual fields (test quadrants, for each eye, have patient detect moving fingers or number of fingers; blink-to-threat in comatose or uncooperative patients) ❑ Visual extinction on double simultaneous stimulation (test for neglect) ❑ Retinal examination (optic neuritis, papilledema, etc) **3. PUPILLARY RESPONSES (CN II, III)** ❑ Direct and consensual responses to light ❑ Accommodation (pupils constrict when fixated on object) ❑ Swinging flashlight test (afferent papillary defect) ❑ Argyll-Robertson (near light dissociation) pupils, Horner's syndrome, Parinaud's syndrome **4. EXTRAOCULAR MOVEMENTS (CN III, IV, VI)** ❑ Smooth pursuit: H-test (nystagmus, delay of movement, lack of movement, ability to track, dysconjugate gaze, gaze palsy, Parinaud's, INO) ❑ Convergence (make the patient cross eyed) ❑ Saccades (switch between two objects) ❑ *Oculo-cephalic and caloric testing (comatose patients)* **5. FACIAL SENSATION/MUSCLES OF MASTICATION (CN V)** ❑ Light touch (tissue) and temperature ❑ Tactile extinction on double simultaneous stimulation ❑ Corneal reflex (includes CN VII) ❑ Jaw jerk reflex (presence is abnormal) **6. MUSCLES OF FACIAL EXPRESSION AND TASTE (CN VII)** ❑ Asymmetry and depth of folds (e.g. nasolabial) ❑ Ask patients to smile, puff out cheeks, clench eyes, wrinkle forehead. ❑ Check taste on anterior part of tongue **7. HEARING AND VESTIBULAR SENSE (CN VII, CN VIII)** ❑ Sound detection (finger rubs, whisper words) ❑ Whine and Weber tests (mechanical vs conduction abnormalities) ❑ Vestibulo-ocular reflex, caloric testing when indicated **8. PALATE ELEVATION AND GAG REFLEX (CN IX, X)** ❑ "Ahhhhhhhhh" ❑ Gag reflex ❑ Check taste on posterior part of tongue **9. MUSCLES OF ARTICULATION (CN V, VII, IX, X, XII)** ❑ Dysarthria vs dysphasia **10. STERNOCLEIDOMASTOID/TRAPEZOID (CN XI)** ❑ Shrug shoulders ❑ Turn head in both directions ❑ Flex neck when supine **11. TONGUE MUSCLES (CN XII)** ❑ Atrophy or fasiculations ❑ Unilateral tongue weakness

Pediatric Neurological Exam Checklist – Motor, Sensory, Reflexes

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Inspection

Visible abnormalities

- ❑ Hypertrophy
- ❑ Wasting
- ❑ Seizure activity
- ❑ Chorea
- ❑ Fasciculation
- ❑ Tremor (postural, intention, resting, etc)
- ❑ Athetosis
- ❑ Dystonia

Palpation

Strength UPPER EXTREMITY

Fingers (resist force)

- ❑ Abduct little finger (C8, **T1**)
- ❑ Grip your fingers (C7, **C8**)
- ❑ Make an "O" (C6, C7, C8)
- ❑ MP joint extension (**C7**, C8)

Wrist

- ❑ Extension (**C6**, C7)
- ❑ Flexion (**C7**, C8)

Elbow

- ❑ Flexion (C5, C6)
- ❑ Extension (C6, **C7**, C8)

Shoulder

- ❑ Shoulder external rotation (elbow's flexed 90°) (**C5**, C6)
- ❑ Shoulder abduction (**C5**, C6)
- ❑ Shoulder shrug (**XI**, C3-5)

Thumb

- ❑Abduction (plane of palm)**(radial nerve C7, C8)**
- ❑Adduction (plane of palm)**(ulnar nerve** C8, **T1)**
- ❑Abduction (perpendicular to palm) **(median nerve** C8, **T1)**
- ❑Opposition **(median nerve** C8, **T1)**

Reflexes UPPER EXTREMITY

- ❑ Biceps (C5)
- ❑ Brachioradialis (C5, C6)
- ❑ Triceps (C7)
- ❑ Finger flexors (C8)

Strength LOWER EXTREMITY

Patient (do with gait)

- ❑ Heel walk (L4, **L5**)
- ❑ Toe walk (S1, S2)

Foot (resist force)

- ❑ Toes extension (L5, S1)
- ❑ Great toe flexion (S1)
- ❑ Foot inversion (L4, L5)
- ❑ Foot eversion (L5, S1)
- ❑ Foot extension (L4, L5)
- ❑ Foot flexion (S1, S2)

Knee (resist force)

- ❑ Knee extension (L2-L4)
- ❑ Knee flexion (**S1**, S2)

Hip (resist force)

- ❑ Hip flexion (**L1-L3**/L4)
- ❑ Hip extension (L5, **S1**)
- ❑ Hip adduction (L2-L4)
- ❑ Hip abduction (L5)

Reflexes LOWER EXTREMITY

- ❑ Knee jerk (L2, L3, **L4**)
- ❑ Posterior tibialis (L5)
- ❑ Ankle jerk (S1)
- ❑ Babinski sign
- ❑ Crossed adduction

Other Components

Muscle Power

0 = none
1 = flicker
2 = move with no gravity
3 = against gravity
4 = against some resistance
5 = against resistance

Muscle Tone

- ❑ Normal
- ❑ Spasticity and clonus
- ❑ Rigidity and cogwheel
- ❑ Hypotonia

Deep Tendons Reflexes

0 = absent
1 = trace
2 = normal
3 = brisk
4 = clonus (non-sustained)
5 = sustained clonus

Pediatric Neurological Exam Checklist – Motor, Sensory, Reflexes

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EXAM	OSCE ITEMS

Palpation	**Sensory LOWER EXTREMITY**
	❑ Perianal (S2-S4)
	❑ Lateral/sole of foot (S1)
	❑ Dorsum of foot/1st web space (L5)
	❑ Medial ankle and shin (L4)
	❑ Medial thigh above patella (L3)
	❑ Anterior mid thigh (L2)
	❑ Lateral thigh below inguinal ligament (L1)
	
	Sensory UPPER EXTREMITY
	❑ Medial arm near elbow (T1)
	❑ Little finger, distal radial border, dorsal base of thumb near web space (C8)
	❑ Middle finger (C7)
	❑ Lateral forearm (C6)
	❑ Lateral arm/deltoid (C5)
		Modalities
		❑ Touch
		❑ Pain
		❑ Temperature
		❑ Vibration
		❑ Proprioception
		❑ Cortical sensation
		  ❑ stereognosis
		  ❑ tactile discrimination
		  ❑ graphesthesia

Pediatric Neurological Exam Checklist – Coordination and Gait

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EXAM	OSCE ITEMS	
Supine	**Cerebellar System** Coordination of Extremities ❑ **Upper extremity**: Finger-to-nose (change location, assess accuracy and speed) ❑ **Lower extremity**: Heel-knee-shin test Fine Finger/Hand Movements ❑ Rapid thumb-to-index finger tapping ❑ Rapid hand taping (against examiner – assess rate, rhythm, depth/force of tapping) ❑ Screw light bulb actions ❑ Rapid alternative movements (dorsum tap-to-palm tap)	**Observe and Recognize** ❑ Dysdiadochokinesia (slow, irregular, clumsy movements) tested by rapid alternating movements ❑ Dysmetria (past pointing/overshoot, intention tremor) tested by finger-to-nose and heel-knee-shin tests ❑ Ataxic movements
Standing	**Balance and Gait** Balance ❑ Romberg test (stand and close eyes) Gait (Regular, Tandem, **Forced***) ❑ Stance (width of feet), posture, stability ❑ Raise of foot off ground, circumduction (arched medial to lateral swing of legs), leg stiffness, knee bend, arm swing ❑ Rate and speed, tendency to fall, difficulty initiating walking ❑ Involuntary movements and turns * **Forced gait** = walk on heels/walk on toes	**Observe and Recognize** ❑ Cerebellar ataxia: Appendicular (lateral cerebellar hemispheres) vs trunkal (vermis → e.g. alcohol intoxication) (Wide based gait, difficulty with tandem gait) ❑ Sensory ataxia: Dorsal column (overshoot, wide-based steady gait much worse with eyes closed) ❑ Gait apraxia: For some perplexing reason, patient can perform the actions of walking while supine, but can't do it for real when standing. ❑ Foot drop: Peripheral nerve lesion ❑ Spastic gait: Unilateral or bilateral corticospinal tract (stiffed legged, circumduction, unsteady, tendency to fall towards side of spasticity) ❑ Parkinsonian gait: Basal Ganglia/substantia nigra lesion (slow, shuffling narrow gait, difficulty initiating walk) ❑ Myopathic gait: Due to muscle pathologys (waddling and lurching gait, Trendelenburg's sign)